

2012 Chem 112 Exam 5 Review

Chapter 10

1. What are the different types of energy?
2. How do you know if a process is endothermic or exothermic?
3. What is thermochemistry?
4. First Law of Thermodynamics aka: the law of conservation of energy
5. The difference between the system and the surroundings
6. Be able to write a thermochemical equation (includes ΔH)
7. Be able to write a reaction for
 - A. Enthalpy of formation
 - B. Enthalpy of ionization (dissolution or solution)
 - C. Enthalpy of neutralization
 - D. Enthalpy of vaporization
 - E. Enthalpy of sublimation
 - F. Enthalpy of fusion
8. When talking about heat flow (q) the q of the system = $-q$ of the surroundings
9. Heat (q)
 - A. $q = mc\Delta T$ when using specific heat
 - B. $q = C\Delta T$ when using heat capacity
 - C. $q = n\Delta H$ when working with heat (enthalpy of reaction, solution or formation)
 - D. Make sure the values match
10. Hess's Law (Third law of thermodynamics)
 - A. The ΔH of a process is equal to the sum of the steps involved
 - B. If a process is reversed then the sign of ΔH is flipped
 - C. If a step has to be doubled or tripled etc then ΔH is doubled or tripled etc
11. $\Delta H_{\text{reaction}} = \sum V_p \cdot \Delta H_f (\text{products}) - \sum V_r \cdot \Delta H_f (\text{reactants})$

Chapter 11

1. Characteristics of a gas
 - A. A sample of gas assumes both the shape and volume of the container
 - B. Gases are compressible
 - C. The densities of gases are much smaller than those of liquids and solids and are highly variable depending on temperature and pressure
 - D. Gases form homogeneous mixtures (solutions) with one another in any proportion
2. Boyle's Law
For a fixed amount of gas at a constant temperature Pressure is inversely related to Volume
Therefore $P_1V_1 = P_2V_2$
3. Charles Law
The volume of a fixed amount of gas at constant pressure is directly proportional to temperature. Therefore $V_1/T_1 = V_2/T_2$
4. Avogadro's Law
 - A. The volume of a gas at a given temperature and pressure is directly proportional to the quantity of the gas
 - B. Mole ratios of gases in a balanced chemical equation is equal to volume ratios
 - C. 1 mole of any gas at STP is 22.4 L
 - D. The same moles of any gas will exert the same pressure
6. Ideal Gas Law
 - a. $PV = nRT$ where P is pressure in atm; V is volume in L; n is moles; R is the gas constant 0.0821 L atm/ mol K and Temperature is in Kelvin
 - b. Be able to use the ideal gas law and stoichiometry
 - c. What makes a gas "ideal"
7. Dalton's Law of partial pressure: $P_A = \chi_A P_T$
The total pressure in a container is equal to the sum of the individual partial pressures of each of the gases present in the container
 - A. Find information about gas collected over water
 - B. Find the individual pressure of a gas in a tank
8. Van der Waal's Eqn and Non-Ideal Gases
 - A. every gas deviates from ideal behavior especially at high pressures
 - B. takes into account attractive forces between molecules (a) and molecular volumes (b)
 - C. Be able to use the equation that will be given to you